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Getting the INSIDE Story
Learning to Express Containment in Tzeltal and Hindi[1]

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INTRODUCTION

This chapter compares young children's uses of semantically specific and general relational containment terms (e.g., *in, enter, insert)* in two unrelated languages, Hindi and Tzeltal, with the aim of assessing the role of a semantic specificity preference in children's vocabulary acquisition.

How children learn the meanings of words is a core puzzle in the study of language acquisition. There are commonalities in the general types of semantic notions that tend to get lexicalized across languages and those that are acquired early—for example, concepts of motion, possession, attribution, and the existence, location, and disappearance of objects (Bowerman, 1973; R. Brown, 1973; E.V. Clark, 1973; Johnston & Slobin, 1979; Slobin, 1973, 1985). There is also, however,

[1] This chapter began as a talk at a workshop in honor of Melissa Bowerman held at the Max Planck Institute, Nijmegen, on April 3, 2002. The chapter is an offshoot of a crosslinguistic study on motion verbs presented at the Stanford Child Language Research Forum in April 2002 (Bowerman et al., 2002), part of which we also presented at the Netherlands Eerste Taal (NET) Conference in Nijmegen in March 2002; a revised version will appear in Slobin et al., in press. We are grateful for the help in understanding our data provided by our collaborators, and for the feedback from many others at these forums.

wide variation in how languages cut up the world into semantic categories, variation which is perhaps most systematically documented for the spatial domain (e.g., Ameka & Levinson, 2007; Levinson & Meira, 2003; Levinson & Wilkins, 2006; Majid, Enfield & van Staden, 2006). Children beginning to speak have to integrate the ways in which speakers around them use words in particular contexts with the prelinguistic categories they have already formed, in order to prune or expand these categories. They may have to create new categories, so that they can use words in the situations that call for them and not in others. They do this at an astonishing rate and from a very young age.[2] The categories that they form also look language-specific from a very young age, as demonstrated by the work of Bowerman and her colleagues since the early to mid-1990s (Bowerman, 1996; Bowerman & Choi, 2001, 2004; Brown, 2001, 2008; Choi & Bowerman, 1991; de Leon, 2001). How children do this is still something of a mystery.

In the abundant literature on this subject, the issue of how children acquire the meanings of relational terms—verbs, adpositions, particles—has been the focus of much attention, especially in the domain of space (Choi & Bowerman, 1991; Clark, 1973; Coventry, Prat-Sala & Richards, 2001; Gentner, 1978, 1982; Huttenlocher, Smiley, & Charney, 1983; Johnston, 1984; Johnston & Slobin, 1979; Landau & Stecker, 1990; McCune-Nicolich, 1981; Piaget & Inhelder, 1956, among many others). Some researchers have suggested that, due to the transitory nature of events, labels for events are harder to acquire than are labels for concrete objects (Gentner & Boroditsky, 2001; chapter 1, this volume; Imai, Haryu, & Okada, 2002; Mintz & Gleitman, 2002). The linguistic framing of events has been proposed as an important factor in helping children extract event categories from the perceptual flux in which events are embedded (Fisher, Hall, Rakowitz, & Gleitman, 1994; Gleitman, 1990), and Genter and Boroditsky (2001) have argued that there is more crosslinguistic variation in how languages construe events than in the labeling of objects.[3]

Yet, as Gentner and Boroditsky point out, not all the events which are labeled in language are alike; they vary in perceptual and cognitive complexity. One dimension of difference in words used to label events has to dp with how much information about the event is packaged into the word. Some event labels are "general" or "light" covering a wide range of situations—as, for example, the English verbs *do, make, get, give*. Others are much more specific to particular situations. For example, the Mayan language Tzeltal divides the domain of eating into many different kinds of eating, with distinct verbs for 'eat tortilla-like things,' 'eat meat-like things,' 'eat soft things,' 'eat crunchy things,' 'eat sugarcane,' and others. Semantically specific verbs of this sort, unlike more general verbs (like 'give,' 'get,' etc.), subcategorize for specific properties of objects; such verbs encode "covert object categories" (Bowerman 2005, 2008).

[2] See Carey (1978), who estimated that children must learn on the order of five words a day from age 1;6 to age 6.

[3] Some researchers have argued that there is much more crosslinguistic diversity in noun seman tics than psychologists have believed (Brown, 2001; Gathercole, Thomas, & Evans, 2000; Lucy, 1992).

This leads to the following question: Do children find relational expressions of a particular level of specificity easier to learn? A number of researchers have observed that children learning Indo-European languages initially rely on semantically very general verbs; in their first year of speaking they make heavy use of verbs like 'do,' 'make,' 'want,' 'go,' 'give,' 'get' (Clark, 1993; Goldberg, 1996; Ninio, 1999a, 1999b), suggesting that these light verbs are easy to learn. This contrasts with the equally plausible but incompatible possibility that labels for events that stand for particular schemas denoting specific (classes of) objects (e.g., *bake*, which applies to certain classes of objects such as cakes, bread, etc.) are easier to learn than those for events that are more abstract (e.g., *make*, which is relatively semantically general, ranging over many different types of objects and event types). There is some evidence that event labels denoting actions or states specific to particular (classes of) objects can be acquired at the same time as event labels that are more abstract (e.g., Brown 1998, 2001, for Tzeltal; de Leon, this volume for the related language Tzotzil). Gentner and Boroditsky (2001) relate early use of semantically specific verbs in languages like Tzeltal to the fact that such verbs refer to coherent event schemata that are more highly individuated and hence, in general, perceptually salient for children. Further, labels that conflate more elements of the event (e.g., verbs such as *enter*, which conflates motion and containment), might also be preferred by children over labels that are more general and apply to a wider range of contexts (e.g., particles such as *in*, used in both static and dynamic contexts) (cf. Gentner & Boroditsky, 2001).

One confounding factor in exploring the role of semantic specificity in the acquisition of relational terms has to do with input frequency (cf. Theakston, Lieven, Pine, & Rowland, 2004). Since semantically specific terms tend to be less frequent than general expressions, an absence of such expressions in children's early production might well arise from their sparsity in the input. But children's use of relational expressions in particular contexts may provide some evidence of a semantic specificity preference. For instance, children may not initially generalize their uses of semantically general expressions in a productive way even if they occur frequently and are extended to a wide range of contexts in the input. Rather, they might use semantically general expressions often but "in an overly conflationary manner, retaining the objects as well as the relational elements" (Gentner & Boroditsky, 2001, p. 245). Further, semantically specific terms might be acquired early even if relatively infrequent in the input, since they apply to a smaller range of situations by virtue of conflating more semantic elements in their meaning. Hence they do not place demands on children to generalize very widely across diverse contexts of use at a stage when the child may not have had sufficient exposure to the input to determine the appropriate basis for generalization.

The role of semantic specificity in child vocabulary acquisition has not been systematically explored across languages in a single semantic domain, nor for relational terms other than verbs (e.g., for case, adpositions, spatial nominals). Crosslinguistic data can be examined to see whether semantically specific relational expressions that occur with comparatively low frequency in the input are nevertheless

acquired as early as semantically general expressions, and whether children ini tially show a tendency to severely restrict their uses of semantically general terms. This chapter performs this comparison for the domain of containment relations. In Figure 4.1 we schematize the contrast between the types of lexicalization we are addressing, for the domain of containment relations. The circles represent the situ ations in which a particular linguistic expression applies. Containment terms with relatively specific meanings cover a small range of situations and are represented by the smaller circles (e.g., Tzeltal semantically specific insertion verbs, such as *tik'* 'insert [into something that has opening into an 'inside,' i.e., a 3D container of some sort]' or *lut* 'lodge tightly between objects [e.g., parallel objects (lips) or a forked object (tree branches)]'). Terms with relatively general containment senses cover a wide range of situations and are represented by larger circles (e.g., "enter'). The most general terms, compatible with both static and dynamic containment contexts (e.g., 'in') are shown in the largest circle. *•-

The "semantic specificity hypothesis" proposes that children's early relational meanings are "overly conflationary," retaining properties of the objects involved in the events to which relational labels are applied. It also suggests that children may be overly context-bound by virtue of inappropriately conflating more *relational* elements (e.g., containment and motion) in the use of semantically general expressions (such as locative case-markers that apply to both static and dynamic . contexts). If children have a preference for semantically specific expressions, those that are used for a narrow range of contexts, we would expect them to (1) acquire semantically specific terms at least as early as semantically general terms; (2) use such expressions appropriately even if they occur with relatively low frequency in

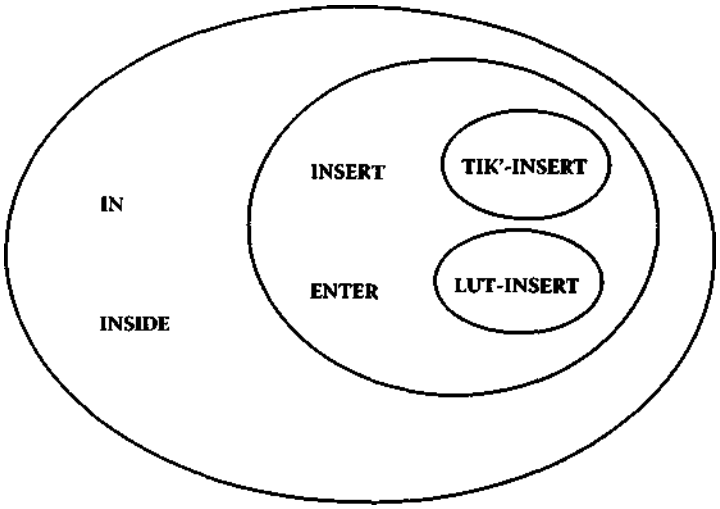

Figure 4.1 General and specific containment terms.

the input; and (3) initially underextend semantically general forms even if they are used frequently and in a diverse range of contexts by caregivers.

In the present study we focus on children's and caregivers' uses of a set of terms of different syntactic categories, all of which encode the semantic notion of containment or motion into containment. We have several reasons for thinking that this approach can help us to evaluate the "semantic specificity hypothesis." First, containment is an important notional concept, one especially salient to children (Piaget & Inhelder, 1956; Slobin, 1985)—young children put things into containers when possible, and presume that 'put-in' is the meaning of nonsense verbs in container contexts (Clark, 1993; Jensen de Lopez, 2002). Across languages, a prototypical notion of containment is frequently lexicalized; Wierzbicka (1996) claims INSIDE as a semantic universal, although the linguistic categorization of the domain can vary across languages (Brown, 1994; Bowerman, de Leon & Choi, 1995; Haviland, 1994). Second, by comparing forms within the same semantic domain, one avoids the risk of confounding variables. For example, a semantically specific form in a particular domain (e.g., 'eat-tortilla') might be preferred over a "light" form in another domain (e.g., 'make') because the particular semantics of that domain (e.g., eating) proves inherently attractive to the child rather than because the specificity of the verb is favored by the child. Third, by comparing terms belonging to different form classes (e.g., case markers and spatial nominals in Hindi, verbs, directionals and spatial nominals in Tzeltal), we can examine the issue of semantic specificity across form class distinctions. Fourth, we have comparable situations involving containment in both the Hindi and Tzeltal data sets of child-caregiver interactions, collected longitudinally to allow for the study of developmental change. And fifth, by comparing children's uses of containment terms with those of their caregivers, we can establish the extent to which frequency and diversity of contexts of use in the input influence children's uses as well.

Hindi and Tzeltal, two languages spoken on opposite sides of the world, contrast nicely in their lexical resources for talking about things being IN and entering INTO containment.[4] In the next section we spell out these lexical resources and set out the hypotheses we will entertain concerning the role of semantic specificity in children's approach to learning these words. Then we describe our data-collection and methodological procedures. In the next two sections, we inspect Hindi and Tzeltal-speaking caregivers' input, as well as children's early language production at two time points—at the two-word stage and a few months later—to show what forms the children use and which forms they prefer when talking about containment. Finally, we draw some conclusions about the role of semantic specificity in influencing children's early word productions.

Hindi is spoken by about 360 million speakers, primarily in the Indian subcontinent. The data reported in this study come from Narasimhan's longitudinal corpus of four children collected in New Delhi. Tzeltal is spoken by approximately 250,000 Mayan indigenous people in Chiapas, Mexico. The Tzeltal data come from Brown s longitudinal corpus of five children, in the community of Tenejapa.

LEXICALIZATION OF THE CONTAINMENT DOMAIN IN HINDI AND TZELTAL

We define containment broadly to mean inclusion of (part of) one entity within the boundaries of a second entity which might be three-dimensional (e.g., *walk into the room),* two-dimensional (e.g., *the dot is in the circle),* or one-dimensional (e.g., *the point is in the line).* Motion into containment then involves boundary crossing to a place or region conceptualized as enclosed, containerlike in some way. A basic containment notion (IN, INSIDE) is taken to be a primitive in lin guistic and psycholinguistic theories (e.g., Jackendoff, 1983; Miller & Johnson-Laird, 1976; Wierzbicka, 1996).[5] Such a notion of containment can be expressed in words from a variety of syntactic categories, including verbs *(enter, insert),* adpositions *(in, into),* particles *(in),* and spatial nominals *(inside),* among others (cf. Jackendoff, 1990).

What words in everyday speech to children are used in talking about relations of containment? Hindi and Tzeltal are both "verb-framed" languages (Talmy, 1985, 1991), both having basic-level verbs meaning 'enter' and other path-encoding motion verbs. Yet the resources for talking about containment situations go well beyond verbs; we shall look at the relevant forms across all word classes to get a sense of which forms, in which word classes, are preferred in children's early uses in these two languages. We restrict ourselves to forms frequent in speech of young children.

Containment Expressions in Hindi

In Hindi,[6] containment is expressed with the verbs *ghus* 'enter' and *ghus-aa* 'enter-CAUSE,' as well as with nonverbal spatial relators such as the locative case-marker *mE* 'in(to)' and the spatial nominal *andar* 'inside.' The verbs *ghus* and *ghusaa* select Ground expressions which occur as noun phrases that are case-marked with the locative case marker *mE* 'in(to)' or as possessed spatial nominals such as X *ke andar* 'X=GEN inside'; that is, 'X's inside.' The spatial nominal can also occur in isolation (e.g., *andarjaa* 'inside go'). The locative case-marker and spatial nominal may also occur with verbs that do not encode the notion of containment in themselves, to describe caused motion (e.g., *Daal* 'put/drop') or spontaneous motion *(e.g-,jaa* 'go') into containment. The basic kinds of schemata for predicating containment in Hindi are given in (1):

[5] But see Haviland (1994) for an argument against the universality of such a primitive, based on data from Tzotzil, a Mayan language closely related to Tzeltal.

[6] Hindi transcribing conventions include: E (nasalized close mid front vowel *lei),* D (retroflex plosive), and = (which, following the Leipzig glossing rules, indicates a clitic boundary between a root and a case postposition).

(1) Schemata for location/motion predications in Hindi[7] a.

Transitive motion:

Agent	**Figure**[8]	**Ground + Loc.Case/ Spatial Nominal**	**Verb**
NP	NP	NP = Loc	VERB *ghuH-*
us = ne	*kitaab-fy*	*thaele* = mE	*aa-yii*
he = Erg	book-Nom	bag = Loc	enter-Caus-Sg.Fem.Prf

'He inserted/crammed the book in the bag.'

NP	NP	NP = Gen Spatial Nominal	VERB
us = ne	*kitaab-§*	*Dibbe = ke andar*	*rakh-ii*
he = Erg	book-Nom	box = Gen inside	put-Sg.Fem.Prf

'He put the books inside the box.'

Intransitive (motion):

Figure	**Ground +** Loc.Case **/Spatial Nominal**	**Verb**
NP	NP = Loc	VERB
wo	*kamre* = mE	*ghus-aa*
he-Nom	room = Loc	enter-Sg.Msc.Prf.

'He entered the room.'

c. Intransitive (location):

Figure	**Ground +** Loc.Case **/Spatial Nominal**	**Verb**
NP	NP = Gen Spatial Nominal	VERB
wo	*Dibbe = ke andar*	*hae*
it-Nom	box = Gen inside	be.3Sg.Pres

'It is in the box.'

Some examples from the child language database instantiating the schemas above are provided in (2) to (4):

(2) *wo... usii = ke andar ghus jaa-tii hae*
it-Nom.. .that.only = Gen inside enter go-Fem.Imprf be-3Sg.Pres
'it [car]...enters inside only that.' (Child, 27 months)

(3) *gaaD\ii = ke andar rakh do is = ko*
car = Gen inside put give.Imp this = Ace
'Put this inside the car.'(Mother, when child is 20-21 months)

(4) *gol-ty is = mE lag-aa-o*
round-Nom this = Loc attach-Caus-Imp
'Put the round (thing) in this.' (Mother, when child is 20-21 months)

These containment terms can be grouped in cross-cutting ways on the basis of semantic specificity. One distinction is based on what semantic elements are conflated in their meanings (Talmy, 1985). Whereas verbs that conflate caused or

Hindi gloss conventions: *Erg.* Ergative; *Nom:* Nominative; *Ace:* Accusative; *Dat:* Dative; *Gen:* Genitive; Loc: Locative; *Ins:* Instrumental; JVF: Nonfinite verb; *Pst:* Past tense; *Pres:* Present tense; *Fut:* Future tense; *Sg:* Singular; *Msc:* Masculine; *Fern:* Feminine; *Imprf:* Imperfective; *Part:* Participle; *Prf:* Perfect; *Ind.caus:* Indirect causative.

We use the terms Figure and *Ground* in Talmy's (1985) sense: Figure is the object being located; Ground is the object or place in relation to which it is located.

spontaneous motion with containment *(ghus* 'enter,' *ghusaa* 'enter-CAUSE') are restricted to expressing containment in dynamic contexts (motion into containment), the nonverbal spatial relators (case-marker *mE* 'in(to)' and spatial nominal *andar* 'inside') are more general and can be used to express containment in both static and dynamic contexts. Cross-cutting the conflated-unconflated distinction is the dimension of selectional restrictivity. The case-marker *mE* can be used for two-dimensional Ground objects (e.g., surface of wall, ceiling, in examples 5, 6) as well as three-dimensional Ground objects (e.g., cup, in example 7), whereas the spatial nominal *andar* is typically used with three-dimensional Ground objects (e.g. bowl, apple, in examples 8, 9). In addition, the spatial nominal *andar* tends to be used for whole inclusion, whereas *mE* tolerates partial inclusion as well.[9]

(5) *tasviir-§ diiwaar = mE Tang-ii hu-ii hae* Picture-Nom wall = Loc hang-Sg.Fem.Prf be-Sg.Fem.Prf be.3Sg.Pres 'The picture is suspended ON the wall.' [lit.: IN]

(6) *kiiD\aa-§ chat = mE lag-aa hu-aa hae* Insect-Nom ceiling = Loc attach-Sg.Msc.Prf be-Sg.Msc.Prf be.3Sg.Pres 'The insect is attached ON the ceiling.' [lit.: IN]

(7) *seb~§ kap = mE rakh-aa hu-aa hae* Apple-Nom cup = Loc place-Sg.Msc.Prf be-Sg.Msc.Prf be.3Sg.Pres 'The apple has been placed IN the cup.'

(8) *seb-§ kaTorii = ke* ***andar*** *hae* Apple-Nom saucer = Gen inside be.3Sg.Pres 'The apple is INSIDE the bowl.'

(9) *tiir-§ seb = ke* ***andar*** *hae* arrow-Nom apple = Gen inside be.3Sg.Pres 'The arrow is INSIDE the apple.'

Comparing across form classes, we see that the verbs *ghus/ghus-aa* 'enter/ enter-CAUSE' are more semantically specific than the spatial nominal *(andar)* and case-marker *(mE),* not only in terms of conflation of semantic elements but also with respect to the types of objects they select for (typically 3D Ground objects, with 2D objects being dispreferred).

Containment Expressions in Tzeltal

Unlike Hindi, Tzeltal has no case marking on nouns and no spatial adpositions (there is only one semantically general preposition in the language). Containment relations are most naturally expressed in verbs. In addition to the intransitive *och* 'enter,' and its transitivized form *otz-es* 'enter-CAUSE,' there is a wide range of semantically specific "insertion" verbs used in everyday discourse, including *ch'ik*

The Hindi examples are taken from an elicited production task with adults, using the "BowPed" picture book series designed to elicit IN-ON terms in various languages (Bowerman & Pederson, 1992).

'insert between two other things [e.g., person between two others, or money tucked in between skirt and belt]),' *tik'* 'insert [into something that has an opening into an "inside," i.e., a 3D container of some sort],' *lut* 'lodge tightly between objects [e.g., parallel objects (lips) or forked object (tree branch)]' (see examples 14-16 below). These verbs form a contrasting set of terms for referring to particular types of insertion events differentiated with respect to the geometric properties of Figure, Ground, and their spatial relationship.[10] A second possibility in Tzeltal is to use a noninsertion verb along with the directional *ochel* 'entering,' indicating that the action of the verb takes place in an 'entering' direction (examples 13, 17). Finally, there is one nonverbal spatial relator for containment relations, the spatial nominal *y-util* 'its-inside' (example 17).[11]

The basic intransitive and transitive schemata for location and motion predications of a Figure in relation to a Ground in Tzeltal are given in (10).[12]

(10) Schemata for location/motion predications in Tzeltal a.

Intransitive:

Verb	**(Directional)**	**Prep**	**Ground (Figure)**
ya x- ***och-*** *0*	*al*	*ta*	*koral*
ICP ASP-enter-3A	DIRcome	PREP	corral

'He's coming into the corral.'

'"There are more than 50 Tzeltal roots whose semantic content includes reference to containment in some sense. This is not a clearly bounded set because many Tzeltal verbs are sensitive to spatial properties of the Figure/Ground relation achieved by the verb (Brown, 1994). Insertion scenes merge into those of attachment, holding (in hand or arm), carrying, and positioning of objects. No syntactic properties (to our knowledge) demarcate these (to a speaker of English) distinct notional sets. It is also a peculiarity of many of these specific verbs that they do not categorize insertion events per se but rather the configuration of Figure/Ground objects where one is inserted in the other; depending on the syntax they can flip which is Figure and which is Ground. For example, *xoj* 'insert-solid-object-into-containment relation' can be used to talk about inserting a ring onto a pole or inserting the pole into the ring (see Brown, 1994 for details). What these verbs mean is more like 'achieve a certain Figure/Ground relationship such that one item is INSIDE another one.' This Figure/Ground reversibility is even true for the canonical "enter" verb *och.* It is not true, however, for the three semantically specific verbs found in the early Tzeltal data discussed here.

Y-util 'its-inside' is also in a contrast set with about 20 other "relational nouns" used to specify spatial relationships between objects. These include *y-olil* 'its middle,' *s-bo* 'its topside,' *y-anil* 'its underneath,' *y-ajk'ol* 'its-uphill (uphillwards or above it),' *y-alan* 'its-downhill (downhill-wards or below it),' and a number of more concrete bodypart terms ('its-head,' 'its-back,' 'its-belly,' etc.). See Levinson (1994), Brown (2006) for details.

[12]The grammatical abbreviations for Tzeltal are as follows: 1, 2, 3E = 1st, 2nd, 3rd person ergative; 1,2,3 A = 1st, 2nd, 3rd person absolutive, lplincl = 1st plural inclusive, lplexcl = 1st plural exclusive; ASP = neutral aspect, ICP = incompletive, CMP = completive, ACS = achieved change of state; ART = definite article, CAUS = causative suffix, CL = sentence-final clitic, DEIC = deictic particle, DIR = directional, IMP = imperative, NEG = negative, PT = particle, PREP = preposition, VOC = vocative, ! = proposition assertion ('it is the case that...').

b. Transitive:

Verb					**(Directional)**	**Prep**	**Ground (Figure)**	**(Agent)**
ya	*k-*	*otz-*	*es-*	*O*	*tal*	*ta*	*s-koral*	*te* *wakax-e*
ICP	3E-	enter-CAUS-3A			DIRcome	PREP	3E-corral	ART bull-CL T

make the bull enter (in)to its corral'

Some examples from the Tzeltal child database follow:

(11) Intransitive 'enter'

eso	*och-O*	*ix*	*ta*	*sit.*
thus	enter-3A	ACS	PREP	eye

'Thus it has entered (someone's) eye.' [soap liquid]

(12) Transitive 'enter'

ma	*me*	*'w-otz-es-O*	*ajch'altey*	*ta*	*ja'*	*i*	*antun*
NEG	PT	2E-enter-CAUS-3A	mud	DEIC	PREP	water	DEIC VOC

'Don't make mud enter there into the water, Antun.' [i.e., 'Don't put mud into the water.']

(13) Verb + directional 'entering'

ma	*x-a'w-ak'-O*	*ochel*	*ta*	*kajpe*
NEG	ASP-2E-put-3A	entering	PREP	coffee

'Don't put it entering (in)to the coffee.' [toy car, into coffee beans spread out to dry]

(14) Transitive specific verb: *tik'* 'insert into container with definable entry place"
[grandmother tells child to insert puzzle piece in board]

W	*x-a'-tik'-O*	*i*	*xawin*	*i*
here	ASP-2E-insert-3A	DEIC	cat	DEIC

'Here you should insert this cat [puzzle piece].'

(15) Transitive specific verb: *lut* 'insert tightly between two supports' [e.g., into mouth]

ma	*x-a'-lut-O*	*mene,*	*ay-O*	*y-ajch'alel*
NEG	ASP-2E-insert.between-3A	that.one	EXIST-3A	3E-mud

'Don't insert that one between things [i.e., your lips], it has mud (on it).'

(16) Transitive specific verb: *ch'ik* 'insert between'

ch'ik-0	*ix*	*a*
insert.between-3A	ACS	DEIC

'(You) inserted it there.' [gum into mouth]

(17) Containment expressed in a directional adverb and spatial nominal *y-ut(il)* ***ik'-a***

	laj	*ochel*	*If*	*ta*	***y-ut(il)***	*na'*	*ini* take-
IMP	QUOT	DIRenter	here	PREP	3E-inside	house	here

'Take this one entering here to the inside of the house [i.e., take it into the house].'

(18) Stative containment with a positional adjective derived from a positional verb root
[MAN (age 8) tells Frog story]

xojol-O	*s-jol*	*ta*	*ala*	*tepil-e*
inserted-3A	3E-head	PREP	DIM	shoe-CL

'His head is inserted in the little shoe.'

As in Hindi, containment terms in Tzeltal are classifiable in cross-cutting ways based on conflation patterns and selectional restrictions. The verbs *och* 'enter' and *otz-es* 'enter-CAUSE' express containment in dynamic contexts (motion into containment); the directional adverb *ochel* 'entering' and the spatial nominal *y-util* 'its-inside' are more general and can be used to express containment in both static and dynamic contexts. Within the class of verbs, this conflation pattern distinction is cross-cut by the dimension of selectional restrictivity. *Och* 'enter' and *otz-es* 'enter-CAUSE' are relatively semantically general with respect to the kinds of objects which constitute the denotata of their arguments. Many other insertion verbs encode specific properties of the Figure or Ground objects they can be predicated of—for example, *ch'ik* 'insert-between-things' (e.g., firewood into fire), *lap* 'insert long-thin-sharp-thing through flexible Ground' (e.g., safety-pin in cloth, needle through mat), or *tik'* 'insert into container with opening' (e.g., rabbit into hutch; see examples 14-16 above). In contrast to Hindi, although Tzeltal has a general-specific contrast within the class of caused motion-into-containment verbs, there is no similar distinction within the class of nonverbal spatial relations expressing containment (i.e., with the relational noun *y-util* 'its inside'). There is no form in Tzeltal with a meaning of IN as general as that for Hindi *mE.*

Summarizing, Hindi and Tzeltal have unconflated words encoding containment alone *(andar, mE* in Hindi; *y-util* in Tzeltal), as well as verbs encoding motion into containment *(ghus/ghus-aa* 'enter/enter-CAUSE' in Hindi, *och/otzes* 'enter/enter-CAUSE' and many more specific insertion verbs *tik', lut,* etc. in Tzeltal). Further, there is a cross-cutting dimension having to do with the (selectional) restrictions imposed by the relational term on the type of object or subtype of containment relation. The spatial nominal *andar* in Hindi prefers Ground objects that are three-dimensional, and implies (but does not entail) complete inclusion, whereas the case-marker *mE* can be used for two-dimensional Ground objects as well. In Tzeltal, there is one spatial nominal for containment, *y-util* 'its-inside,' used with Ground nominals referring to three-dimensional objects that have an 'inside,' as well as one used for two-dimensional relations, *y-ol(il)* 'between' 'in middle of.' But in the verbal domain there is both a general verb encoding motion into containment *(och/otz-es)* and a range of specific verbs of motion into containment which encode properties of the Figure and Ground as well *(tik', lut,* etc.).[13]

THE STUDY

The previous two sections demonstrate a contrast between the two languages in the encoding of (motion into) containment. The specific-general distinction is

In characterizing the semantics of these forms, we are ignoring for the purposes of our analysis more subtle semantic restrictions associated with these forms. For instance, while *ghus-aa* 'enter-CAUSE' in Hindi can be used in the sense of *insert,* it can also be used in contexts where English verbs for tight-containment such as *stuff, cram* are typically used. Further, we have omitted, for the purposes of this analysis, relatively low-frequency verbs such as *ghuseD* shove in, cram' and *ThUUs* 'force down, cram in.'

exemplified in nonverbal relational terms in Hindi (spatial noun, case-marker), whereas in Tzeltal this distinction appears within the verbal domain. Hindi does conflate motion and containment in the verb; however, it lacks the rich set of distinctions in containment verbs found in the Tzeltal verb lexicon. But these typological contrasts in adult language reveal what distinctions *can* be made, not what distinctions *are* made in the input to children. In order to examine "typology in use," we examine the patterns of use of containment expressions in the input to children acquiring Hindi and Tzeltal. We follow with an examination of the use of containment terms in the speech of two children in Hindi and two children in Tzeltal.

Method

Both the adult and child data come from samples of spontaneous language production of two Hindi children ("ISH" and "MAN") and two Tzeltal children ("LUS" and "XAN"), described below. From these samples, we examine both the adult usage of containment terms in the input and children's first uses of containment forms in early acquisition.

Adult Usage in the Input We begin by tabulating the frequency of different containment expressions in caregivers' input speech to children in each of the two languages. Since children cannot know a priori which containment term is semantically general or specific, they must rely on the range of contexts in which these expressions are used in the input. We therefore also establish a profile of contextual diversity of use for each containment term in caregivers' speech to children. This profile might not necessarily correspond to adult intuitions regarding the semantic specificity of containment expressions as outlined above. For instance, even though Hindi *mE* 'in(to)' can be used in both static and dynamic contexts, and with two- and three-dimensional Ground objects in adult language, it might be that caregivers overwhelming use *mE* in dynamic (motion) contexts with three-dimensional Ground objects in talking to their children. In such a case, the diversity of uses of *mE* would not be distinguishable from that of the verbs *ghus* 'enter,' *ghus-aa* 'enter-CAUSE.' The predictions of the semantic specificity hypothesis have to be evaluated in relation to the extensional patterns of the different containment expressions in caregivers' input to children.

Children's Acquisition Having established a profile of the distributional patterns in the input, we can investigate (1) whether children use semantically specific forms as early as they use semantically general forms, even if the former occur infrequently in the input; (2) whether they use such forms appropriately; and (3) whether children initially restrict semantically general forms to a limited set of situations. For instance, even though *mE* in Hindi or *och, otzes* in Tzeltal might be used in a variety of contexts in the input, children might start out using them in highly specific ways, perhaps limited to specific types of objects encountered frequently in association with use of these forms.

In evaluating productivity in children's extensional patterns of use we examine the range of extralinguistic contexts to which containment expressions are applied. For instance, although children's linguistic productivity with a particular expression (e.g., uses of *mE* with a range of different Ground and Figure nominals, and/or co-occurring with a variety of different verbs) would indicate that children are applying the expression to a range of different objects and types of events, the lack of linguistic diversity does not necessarily imply a lack of extensional diversity. For instance, children might restrict their uses of *mE* to just a pronoun (e.g., *is=mE* 'this in'), but the pronoun could be applied to a whole range of different referents (e.g., a basket, a tub, a room, a bag, a picture book, etc.) and different types of events (causative or spontaneous motion, static location). In contrast to the methodology applied in much prior research, we rely not only on the *linguistic* contexts of use but also on the diversity of *situational* contexts of use. These together provide a more accurate measure of patterns of semantic extension of a particular containment expression than linguistic contexts of use alone.

Data Collection and Coding For each language, we examined selected samples of the spontaneous language production of two children, drawn from larger longitudinal databases of videotaped natural interaction of family members and the children (at ages 1;8 to 2;8). The children were audio- and videotaped in naturally occurring and seminaturalistic contexts in their homes, interacting with their caregivers and siblings (and sometimes with the researchers), playing with toys, reading books, or just being together with caregivers (and often other children) either indoors or outdoors. Data were drawn from two time points: roughly the early two-word stage (tl), and three to six months later (t2). The criterion of beginning at the two-word stage led to data being sampled from children whose ages differed by several months from each other. Details of the child samples are shown in Table 4.1.

Representative samples of the input in the two languages were taken from sessions taped prior to the children's tl samples (referred to as "tO"), for the purpose of comparison with children's speech at tl. To examine any changes in the input patterns over time, we also examined caregivers' input at children's tl samples. Note that, in both Hindi and Tzeltal societies, input speech is not necessarily primarily from the mother, so we have included the speech of siblings and other caregivers in the input samples. Details of the input samples are also given in Table 4.1.

From both the child and adult samples we extracted all utterances with relational forms encoding containment, including static uses of these terms (locational), temporal uses, and uses in contexts of caused and spontaneous boundary-crossing motion into a container, broadly construed. Utterances addressed directly to the children as well as to other interlocutors present in the context were included. Immediate self-repetitions and exact imitations of prior utterances were excluded.

TABLE 4.1 Child and Input Samples at Two Time Points*

Speaker, sample	No. of sessions	Approximate duration	Age of focal child
Hindi child data			
ISHtl	5 sessions	3.75 hours	1;8-1;9
ISHt2	3 sessions	2.25 hours	2;3
MANtl	4 sessions	3 hours	2;2-2;4
MANt2	3 sessions	2.25 hours	2;7-2;8
Hindi input			
Mother, ISH tO	4 sessions	3 hours	1;4-1;5
Brother, ISH tO	4 sessions	3 hours	1;4-1;5
Mother, ISH tl	4 sessions	3 hours	1;7- 1;9
Brother, ISH tl	4 sessions	3 hours	1;»-1;9
Mother, MAN tO	4 sessions	3 hours	2;l-2;2
Mother, MAN tl	2 sessions	1.5 hours	2;2-2;3
Tzeltal child data			
LUStl	6 sessions	8 hours	l;ll-2;0
LUSt2	2 sessions	3 hours	2;5
XANtl	4 sessions	6 hours	2;2
XANt2	3 sessions	4.5 hours	2;7-2;8
Tzeltal input			
Cousins, mother, aunts, LUS tO	3 sessions	5.5 hours	1;6
Cousins, grandmother, aunts, LUS tl	6 sessions	8 hours	l;ll-2;0
Sibling, cousins, mother, father, aunts, grandmother, XAN tO	5 sessions	6 hours	1;10-2;0
Sibling, cousins, mothei r, father, aunt, XAN tl	4 sessions	6 hours	2;2

*t0 = first time point at which input to the child was sampled (prior to tl) tl = first time point at which child's utterances were sampled (beginning of two-word stage), and second time point at which input to the child was sampled t2 = second time point at which child's utterances were sampled

Hindi Data

Hindi Input The input in the case of the child ISH comes from the mother and the child's 3-year-old brother (pooled in the table below). In the case of MAN, the input is provided by the child's mother. The number of uses of the different forms at two different time points, tO and tl, for the input to the two children is shown in Table 4.2.

In terms of sheer frequency of use, the term *mE* predominates in the input to both children and at both time points. The term *andar* is used far less frequently, although its relative proportion of use increases over time. The terms *ghus* and *ghusaa* were not used in the input at all in the sessions sampled for this study-In Table 4.3 we illustrate the range of the types of contexts of use for the different containment terms in the input to MAN and ISH at tO. The patterns of input to MAN quite clearly show greater semantic generality for *mE* (measured as contextual diversity of use) relative to *andar* at both time points. The term *andar* is used for three-dimensional Ground objects such as the house or a room. It is also used

TABLE 4.2 Frequency of Containment Terms in the Hindi Input

	ISH		MAN	
	to	tl	**to**	**ti**
mE 'in'	45 (93.8%)	69 (64.5%)	81 (95.3%)	46 (79.3%)
andar 'inside'	3 (6.25%)	38 (35.5%)	4 (4.7%)	12 (20.7%)
ghus/ghus-aa 'enter/enter-CAUSE'	0	0	0	0
Total no. of containment terms	48	107	85	58

in both static and caused or spontaneous motion contexts. The term *mE* is used not only for three-dimensional Ground objects such as a cup, a shelf, and a bottle, but also two-dimensional objects (such as a chart with pictures on it) and distributed objects (such as an array of toy animals). In addition to static and caused/spontaneous motion contexts, *mE* is used for nonspatial contexts as well—for example, to indicate a later point in time *(baad=mE* 'after in') or to refer to events such as festive occasions (e.g., TN the wedding'). In the case of input to the child ISH, we find that both *mE* and *andar* are used in a range of contexts in both the brother's and the mother's speech. But, as in the case of input to MAN, we find that *mE* is used in a wider variety of contexts than *andar* and with a wider range of Figure and Ground objects. The number of nonspatial uses is relatively limited compared to what was found for input to MAN.

In summary, we find that the verbs *ghus* 'enter' and *ghus-aa* 'enter-CAUSE' are not attested at all in the input samples selected for this study. At both time points, tO and tl, the form *mE* is both more frequent and used in a wider range of static and dynamic contexts, and with a greater variety of Figure and Ground objects, than the form *andar*. If distributional patterns in the input play a predominant role in influencing children's use of these forms, we would expect a similar pattern of usage in the children's speech as well. If, on the other hand, children home in on terms that are used in a narrower range of contexts than terms that are more general, we would expect early use of *andar* despite its low frequency (relative to *mE)* in the input. Further, under the specificity hypothesis, children would be predicted to use the term *mE* in a narrower range of contexts than the adults and older children providing the input do, especially in the early stage of development, attl.

Hindi Child Data Despite using relatively broad criteria for inclusion in our samples (excluding only immediate self-repetitions and exact imitations), at time point 1 when the children are just beginning to combine two words together we find relatively few expressions involving containment in the Hindi children's speech. The number of expressions the children use to explicitly encode containment remains low at time point 2. The data for both children are given in Table 4.4.

TABLE 4.3 Selected Types of Contexts of Use: Containment Expressions in the Hindi Input to MAN and ISH at tO

Broad context of use	**Linguistic form for IN**	**Specific context of use**	
		MAN **samples**	**ISH samples**
Stative	*andar*	child (staying) inside the house toys in room/cupboard child inside house	cat seated inside a location in picture book
Spontaneous motion			child inside house
Nonspatial			child squishes plasticine animal within one instant
Caused motion	*mE*	bottle in water toy horse in hand oil in hair aubergine in hand book in the hand tea in toy cup toy block in a location ingredients in the vegetables (remove) oil from inside bottle (remove) toy cow from 'in' group of other animals	clarified butter and salt 'in' bread pencil in hand tea from container into cup cushion 'in' toy sofa toy cow in between two plastic blocks on rod doll in hospital
Stative		ducks (live) in water toffee in shelf food sticking in the throat ache in tooth toy lion in array of toy animals little boy (living) in the neighbourhood lullabies (sung) in village child (folding palms) in temple pictures 'in' a chart (making) bread in toy utensil hair 'in' toy horse mosquitos in the house electricity in light switch	narrating incident that happened 'in' school brother's actions taped in camera pictures of blocks 'in' box lid banana 'in' a tree picture of hippo in hand picture of snake 'in" box lid story in picture book cord of toy phone around ('in') neck picture of rhino in array of cards ache in head

TABLE 4.3 (continued) Selected Types of Contexts of Use: Containment Expressions in the Hindi Input to MAN and ISH at tO

Broad context of use	Linguistic form for IN	Specific context of use	
		MAN	**ISH**
Non-spatial	*mE* (cont'd)	language in which child is reciting lullaby eating toffees at ('in') a later point catching butterfly at ('in') a later point using the phone at ('in') a later point wearing slippers at ('in') a later point child getting off bed in a little while festivity in which fireworks are lit what is eaten at a meal	children getting into fights pictures 'in' child's knowledge [child recognizes pictures]
Spontaneous motion		toy monkey in water child in the temple doll in a box electric current from within light switch tape recorder from within which songs are heard	crocodile in water child in mother's lap plastic block in slot

TABLE 4.4 Frequency of Containment Expressions in Child Hindi

	IS		**MA**	
	tl	t2	tl	t2
mE 'in'	24 (96%)	11 (47.8%)	30 (91%)	45 (98%)
andar 'inside'	1 (4%)	10 (43.5%)	3 (9%)	1 (2%)
ghus 'enter'	0	2 (8.7%)	0	0
ghusaa 'enter-Cause'	0	0	0	0
Total:	25	23	33	46

Despite the few cases, the patterns are quite clear: Use of the different containment expressions by the children shows a similar pattern to that in the input. The frequency of use of *mE* is higher than that of *andar* for both ISH and MAN at time point 1 and at time point 2. The use of *andar* is relatively early in the case of MAN and ISH even in this limited sample, if we apply the criterion of early use once, spontaneously. But there is no evidence that the more specific term *andar* is used more frequently by children than by adults at tl, such that, early on, they produce a more balanced distribution of *mE* and *andar* than is found in the input. At a later point in time (t2), ISH begins to produce more uses of *andar*, but a

TABLE 4.5 Selected Types of Contexts of Use: Containment Expressions Used by Two Hindi Children, MAN and ISH, at tl

Broad context of	**Linguistic form for IN**	Specific context of use	
		MAN	**ISH**
Stative Spontaneous motion	*andar*	object inside plasticine bag child inside house	toy-train in block-like object
Caused motion	*mE*	ball in lap belt inside basket lipstick in eyes	puzzle piece in slot
Stative		ball in market pictures in book snakes (live) in water plasticine toy in lap of 2nd toy king (in picture book) on chair fish (in picture book) in water	child (in picture book) in lap rat (lives) in nest fish (lives) in water flowers on a bush lentil soup in toy pan vegetables in toy pan
Spontaneous motion		container in spread out skirt child in lap child in room doll on couch clip from in hair	child in lap puzzle piece in slot train in water reptile in nest

similar increase in the uses of *andar* is also observable in the input at the second time point (tl). That is, any hypothetical preference for semantically specific forms does not induce the children to overuse specific forms relative to the patterns found in the input. The verb *ghus* 'enter' is also vanishingly rare, and *ghus-aa* 'enter-CAUSE' is entirely absent in the children's data.

Turning now to the contexts of use, we can investigate whether children tend to be initially more restrictive in the range of contexts in which they use semantically general containment expressions relative to adults. Tables 4.5 and 4.6 show the contexts of use for containment expressions produced by ISH and MAN at tl and t2. There is no evidence that the use of *mE* is restricted to a limited set of contexts at tl in the data of either ISH or MAN. Rather, the range of contexts of their initial uses of *mE* is comparable in diversity from the beginning to that found in adult input at tO (from a time point several months earlier; see Table 4.1), as well as to their own production at a later time point, t2. Both children use *mE* in contexts of caused and spontaneous motion to a goal as well as for describing static locations. They also use *mE* for a range of Figure objects (ball, belt, toy lipstick, puzzle piece, plasticine figure) and Ground objects (lap, basket, eyes, storybook, water). Interestingly, despite the frequent uses of *mE* for nonspatial uses in the input to MAN, we find no such uses in MAN's own spontaneous production.

TABLE 4.6 Selected Types of Contexts of Use: Containment Expressions Used by Two Hindi Children, MAN and ISH, at t2

	Linguistic form for IN	**Specific context of use**	
Broad context of use		**MAN**	**ISH**
Caused motion Stative	*andar*	toys in location (room/cupboard/house)	object inside room mud inside room nothing inside box of toy stamps
Spontaneous motion			object in region behind/ under chair object under child who is seated toy inside train
Spontaneous motion	*ghus/andar*		child in space between the back of a chair and the wall toy car in region under (washing) machine
Caused motion	*mE*	powder 'in' face curlers 'in' fingers curlers in hair toy animals 'in' book surface salt in hand pencil in hand tea in toy containers liquid (from) in cup lid 'in' bottle	
Stative		character (in book) in water one bear in lap of big bear character (in picture book) in boat character (in picture book) 'in' the stairs child in bus bear (in picture book) on chair lion (fives) in jungle ducks (live) in water boy (in picture book) on scooter toys in room story in picture book toy animals 'in' book surface cat in car water (in picture book) in flower	brother's fight in school child in swing father in a plane elephant in picture book
Spontaneous motion			fish-shaped puzzle piece in water candle falling 'in' the outside child (going) in(to) class cockroach in nest insect in tea

Conclusions from the Hindi Data The Hindi data suggest that the strong form of the specificity hypothesis is not tenable. The most general, and the most frequent, containment form, the case-marker *mE,* emerges clearly as the preferred choice for encoding containment in early child Hindi, and is used early (at tl) and frequently. The spatial nominal *andar* 'inside' does make an appearance at time point 1 but is used rarely at that point in the data examined. The verb *ghus* 'enter' appears to be dispreferred, at least by our criteria, since it is used only twice at time point 2 by ISH, and in one of these instances, the verb was used after it was used by the child's older sibling in the same recording session. The semantic specificity hypothesis would also predict that children undergeneralize more general forms initially—for example, more at tl than t2, using them only in highly context-bound ways. Undergeneralization of a particular form relative to adult usage is not always easy to demonstrate, since the child's nonuse of a particular form in a context where it might be used is not conclusive. However, the data show that from the beginning, at tl, the children use *mE* quite productively—that is, not restricted to a few contexts where it is repeatedly used. Nor does *mE* occur only with a limited number of Ground-object denoting nominals. It is used in static contexts (e.g., flowers arrayed all over a bush, vegetables in a toy pan) and dynamic contexts (e.g., for caused motion as in putting a puzzle piece in a puzzle board; spontaneous motion as in sitting in mother's lap), and with nominals denoting a variety of Ground objects (e.g., water, page in a book, mother's lap, slot in puzzle board). This finding echoes observations in Bowerman and Choi (2001) suggesting that children have early abilities to generalize the meaning of relatively abstract relational expressions that apply across a wide range of situations (e.g., in the use of English particles such as *in, up).*

The only evidence for a restriction in the Hindi children's usage patterns is seen in the absence of nonspatial reference with the use of *mE* in the spontaneous production of MAN, despite a number of such uses in the input at both tO and tl. Since spatial referents are physical objects that can be seen and observed, whether they are two- or three-dimensional, whether they are small manipulable objects or large places like rooms and houses, it is likely that the child is better able to map labels onto them than onto less imageable notions of situations or points in time.

It is possible that the distribution of the various containment forms in the child's speech is just a reflection of the types of situations that were sampled. Perhaps the rare occurrence *of ghus,* and only at tl, and the relatively infrequent uses *oiandar* (especially at tl) simply reflect the fact that the relevant opportunities for their use did not arise in the recording session (cf. Gentner & Boroditsky, 2001, p. 237). Further research is required to examine such a possibility. However, *mE,* rather than *andar* or *ghus,* was used by the children in contexts where *andar* was a possible lexical choice (e.g., static location of vegetables in a toy pan, putting puzzle pieces in puzzle slots, animal running into nest), as for example in (19):

(19) *bil=mE* *hhaag jaa-egaa.*
nest=Loc run go-3Sg.Msc.Fut.
'will run in the nest'

This example from the child ISH (produced when she sees a cockroach on the ground) provides some supporting evidence that children acquiring Hindi have no strong preference for the forms with more restricted semantics.

Tzeltal Data

Tzeltal Input Samples of input speech were extracted from the data for the two Tzeltal children some months before tl (tO in Table 4.3).[14] As in Hindi, the input data from Tzeltal exhibits a number of containment forms used in a variety of constructions in both static and dynamic contexts, and with different types of Ground and Figure object nominals. This is illustrated in the examples of input from adults and from older children aged 4 to 8 years (examples 20 to 31, drawn not only from tO but also from tl and t2 for both children). The elements with containment semantics are in boldface type.

och—Intransitive

(20) [MET is child's grandmother, the caregiver]
MET: *yak. jich ya x-och-O koel ini.* [pointing]
yes thus ICP ASP-enter-3A DIR this 'Yes, thus it enters descending here.' [road-building machine]

otz-es—Transitive

(21) CAL is a cousin of the two focal children, aged 5; CAN is another cousin]
CAL: *ma x-a'w-otz-es-be-O ix a men antun me'tik*
NEG ASP-2E-enter-CAUS-BEN-3A ACS there that Antun Mrs.
'Don't make it [puzzle piece] enter there any more for that Antun, Mrs.'

Specific Insert-Verbs—Transitive

(22) *tik'* 'insert into container with definable entry place'
CON: *ja' x-a'-tik'-O me yax antz*
! ASP-2E-insert-3A that green woman
'You should *tik* '-insert the green one, woman.' [CON tells LUS how to stack rings onto stick]

(23) *hit* 'insert between two supports' [e.g., into mouth]
MET: *ja'laj la s-lut-O bel tz'i' te paleta-e*
! QUOT CMP 3E-insert-3A DIR dog ART lollypop-CL
'She says the dog carried the lollipop away' [lit: 'she says the dog held-in-mouth-between-parallel supports awaywards the lollipop']

(24) *ch'ik* 'insert parallel [i.e., Iong-thin-thing into others]'
MET: *majtek la '-ch'ik-be-n y-ej i bojch, antz*
not.at.all CMP 2E-insert-BEN-lA 3E-mouth DEIC gourdbowl, woman
'You didn't insert the edge of this gourd bowl (in your mouth), woman.'

"Tzeltal input data included speech of siblings and cousins (age 4 or older) present in the interactions, excluding only LUS, one of the children under study who was often also present in the sessions for her cousin XAN.

(25) *lap* 'insert-thin-sharp thing'
MLU: *ixtal men kuchilu ma me '-lap-be-0 ta 'sil*
here that knife NEG if 2E-insert-BEN-3A PREP 2E-eye 'Here that knife, don't insert (it) [sharp thin thing] in your eye.'

(26) *xij* 'insert long thin thing parallel to others'
MAX: *xij-a k'ajk'. ya x-tak'aj-O tal waj j-we'-tik*
insert-IMPfire. ICP ASP-dry-3A DIR tortilla lE-eat.tortillas-lplincl.
'Insert [stick] [into] fire. The tortillas will toast for us to eat.'

Direction of Motion 'Inwards': *ochel*

(27) CGR: *ma me '-t'uxan-be-ik ochel tz in*
NEG if 2E-make.fall-BEN-pl DIRenter PT
'Don't make him fall inwards then.' [toy man, looking into corral at chickens]

Spatial Nominal—*y-util* 'its inside'

(28) XUN (age 11)
och-an ta ***y-ut*** *na-e*
enter-IMP PREP 3E-inside house-CL
'Enter to the inside of the house.'

Nominalized Containment

(29) XUN (age 11)
XUN: *ay ya s-na'-ix* ***s-tik'-el***
EXIST ICP 3E-know-ACS 3E-insert-NOM
'She already knows how to *tik*'-insert them.' (rings onto stick)

(30) CAN (age 4):
ma (j)-na'-ix y-otz-es-el a ini
NEG (lE)-know-ACS 3E-enter-CAUS-NOM DEIC this '(I) don't yet know how to put this one in.' [lit: its enter-CAUSE-ing]

Static (Adjectival) Context

(31) CON: *pach-al-0*
be.sitting.bowl.shaped.object-DIS-3A
It (a bowl-shaped object with corngruel in it) is sitting.'

The frequencies of use of the different containment terms in the Tzeltal input at tO and tl are summarized in Table 4.7. Children acquiring Tzeltal hear both general verbs for "entering" events such as *och* and *otzes,* much more specific insertion verbs such as *lut, ch'ik,* and *tik'* (and a number of others), and the spatial nominal *y-util.* Among the specific insertion verbs there are 17 different roots, including *ch'ol* 'pour-liquid-into-container,' *kap* 'insert-object-into-group,' *baj* 'hammer-in, *matz'aj* 'get-stuck-in,' *tz'ot* 'twist-into-tight-fit,' *joy* 'put into encircling relation,

TABLE 4.7 Frequency of Containment Terms in the Tzeltal Input [Roots Are in Boldface]

Input stem	LUS		LUS Total	XAN		XAN Total
	to	tl		**to**	**tl**	
Spontaneous motion						
och 'enter'	30 (41%)	10 (14%)	40	0 41 (42%)	6 37 (54%)	0 78
matz'-aj 'get.stuck in.mud'	0	0		(6%)		6
Caused motion—general verb						
otz-es 'enter-CAUSE'	1	5 (7%)	6	27(28%)	0	27
Directional—general						
och-el 'inwards, entering'	3					
Caused motion—specific insertion verbs						
chop	**0**	**0**	**0**	**0**	**1**	**1**
chup	**0**	**0**	**0**	**0**	**2**	**2**
ch'ik	**0**	**0**	**0**	**0**	**5 (7%)**	**5**
ch'ol	**1**	**1**	**2**	**3**	**0**	**3**
kap	**0**	**1**	**1**	**1**	**0**	**1**
kojk-on/kojk-ej	**3**	**0**	**3**	**0**	**0**	**0**
latz	**0**	**1**	**1**	**0**	**1**	**1**
lut	**0**	**1**	**1**	**0**	**2**	**2**
pach	**2**	**0**	**2**	**0**	**1**	**1**
puk'	**4**	**10 (14%)**	**14**	**0**	**7 (10%)**	**7**
tik'	**3**	**34 (47%)**	**37**	**2**	**0**	**2**
t'um(-an)	**1**	**0**	**1**	**0**	**0**	**0**
tz'ap	**1**	**0**	**1**	**0**	**1**	**1**
*V	**0**	**0**	**0**	**0**	**6 (8%)**	**6**
xoj	**1**	**0**	**1**	**0**	**0**	**0**
Stative/Nonmotion IN words						
otz-es-el	**0**	**0**		**9 (9%)**	**2**	**11**
'enter-CAUSE-NOM'						
jul-el 'pierce-NOM'	**1**	**0**	**1**	**0**	**0**	**0**
lut-ul 'inserted.	**4**	**0**	**4**	**0**	**0**	**0**
between- ADJ'						
pach-ajtik 'in.bowl-ADJ.PL"	**1**	**0**	**1**	**0**	**0**	**0**
pach-al 'in.bowl-ADJ'						
tik'-hy-el	**0**	**0**	**0**	**0**	**1**	**1**
insert-DIST-NOM'	**0**	**0**	**0**	**1**	**0**	**1**
s-tik'-rf '3E-insert-NOM'						
t'um-ul 'inserted.in.	**0**	**1**	**1**	**0**	**0**	**0**
water-ADJ'	**2**	**1**	**3**	**0**	**0**	**0**
xoj-ol 'inserted-ADJ'						
***y~ut/y-ut-il* 'its inside'**	**1**	**0**	**1**	**0**	**0**	**0**
NOUN	**13 (18%)**	**5 (7%)**	**18**	**3**	**0**	**3**
***y-ol/y-ol-il* 'its middle/**						
between' NOUN	**1**	**0**	**1**	**0**	**0**	**0**
Total IN words:	**73**	**72**	145	**97**	**68**	165

jul 'pierce-into,' *jut* 'pierce-into,' *lut* 'stick-in-between,' *pach* 'be-in bowl-shaped-container,' *puk* 'mix-into liquid,' *suk* 'put-in stopper,' *tik'* 'insert into container with opening,' *t'uman* 'immerse in liquid,' *xij* 'insert long thing lengthwise,' *xoj* 'put single object into/around another.' Children hear these verbs used both in their transitive forms and in their stative and nominalized forms.

The more general verb *och* 'enter' is also frequent, and for XAN is clearly the most frequent. However, *och* is not as prevalent as the form *mE* in Hindi. *Och* appears in a variety of syntactic forms (in intransitive form, in the directional *ochel,* causativized as *otz-es,* nominalized in *otz-es-el).* Like *mE* in Hindi, the Tzeltal children also hear *och* used in metaphorical (temporal) contexts, as in:

(32) XUN (age 11)

ya	*x-och-O*	*k'op*	*i*
ICP	ASP-enter-3A	fighting	DEIC

'This fighting will enter [i.e., begin].'

Turning to contexts of usage, we illustrate the types of contexts of use for the different containment terms in the input at tO in Table 4.8.

Table 4.8 shows that *och* (along with its causativized form *otz-es)* is not only the most frequent containment term in the Tzeltal input, but it is also the most semantically general, as measured by the range of different contexts of use.[15] *Och* occurs in canonical containment situations of objects going into containers (ball into shoe, puzzle piece into board, frog into pot) and extends to tight containment (popbeads into each other, string into/onto toy animal). It also occurs in situations where the containment is two-dimensional (a split in a balloon) or involves movement into a region rather than a container (ball under chair, chicken into house, child into cart, child into place near the house where her brother is playing, person into house). *Och* also extends to temporal (or metaphorical) contexts (child entering school, work entering computer, child beginning (entering into) singing). A few static contexts are also represented with the nominalized form of *otzes (otzes-el),* and a number of noncontainment verbs co-occur with the directional *ochel* to indicate action toward containment (put into, immerse in liquid) or into a contained region (into house, between two things), or to express static events (looking inwards, smelling inwards).

In contrast with the Hindi data, however, the Tzeltal input also contains a range of other containment terms specialized to much more specific situations. A number of these occur in only one or two kinds of context in the data *(xij* for inserting sticks of firewood into the fire, *lut* for carrying or sticking something in the mouth, *pach* for wanting, carrying, or having corn gruel in a bowl, *puk'* for mixing corn gruel in a bowl). *Tik'* 'insert into container' is the only specific verb that extends to a variety of different kinds of contexts (puzzle piece into board, different objects into pocket or bag), including to the metaphorical insertion of anger into the child's

[15]We conjecture that child-directed speech from the older children (included as "input" in our study) may have contributed to the skewing toward semantically general expressions in the input.

TABLE 4.8 Selected Types of Contexts of Use: Containment Expressions in the Tzeltal Input to LOS and XAN at tO

Broad context of use	Linguistic form for IN	Specific context of use	
		LOS	**XAN**
Caused motion: general	*otz-es*	toys into toy truck	toy into bag hung around child's neck ring onto finger string onto toy car piece into puzzle doll's head back into doll's neck something into toy cart
	V + *ochel* + *y-ut(il)*	toy animals	toy animal, put away in house
Caused motion: specific	*ch'ol*	pouring water for toy animals	pouring water for toy animals pour water into toy cups
	tik'	Alux got his father angry (anger 'inserted')	toys into blue sack
		insert self	toys into toy bag
	kap	—	insert self in between something (off camera)
	kojkonlkojkaj	pour water into container	—
	pach	telling child to hold it upright, don't spill [corngruel in bowl]	
		cany [bowl of corngruel] upright	
	puk'	mixing corngruel in water for child	—
Caused motion + direction	*t'uman + ochel*	dog inserted self in water	—
	xoj	frog's head into shoe	—
Spontaneous motion	*och*	Alux into school	about child going to school
		children into school	tying string onto/into toy animal
		permission to enter the school	turkey into bucket
		children entering house	pop beads into each other
		ball into shoe	split in balloon
		frog into pot, in book	child into house
		owl into tree, in book	tovs in back of toy truck
		'travellers' into toy car	toy car's tire into mud
		nothing in pot, in book-	puzzle piece into board
		toy animal into truck	work into computer
		self into place where brother is playing	doll's head into neck something into cart
		toy into space between coffee bag and wall	
		a load into truck	

TABLE 4.8 (continued) Selected Types of Contexts of Use: Containment Expressions in the Tzeltal Input to LGS and XAN at tO

Broad context of use	Linguistic form for IN	Specific context of use	
		LUS	**XAN**
	och, y-ol	frog into water, in book	—
	och, y-ut	frog into water, in book	—
	matz'aj		toy car stuck in mud pretend announcement that car is stuck in mud
Nonmotion (nominalized or spatial noun)	*otz-es-el*	child getting injection	popbeads into each other piece into puzzle
	tik'-lay-el	—	toys into blue sack
	V+ *y-util*	dog smelling inside of pot, in book dog licks inside of pot, in book dog looking into pot, in book	toy car's inside place work inside computer
Stative/ locative	*och-el*	—	toy man looking in at the chickens
	lut-ul	boy on deer's antlers, in frog book	—
	pach-ajtik	bowl with contents upright	—
	xoj-ol	frog's head into shoe	—
	t'um-ul	frog in water in picture book	—
	y-ut	toy chicken thrown into the house dog in water, in book	'
	y-util	inside the little pot in book	—

father! While these terms (except for *tik')* are used with far less frequency than *och* and *otzes,* they are used reliably in these very specific contexts.

The spatial nominal *y-ut(il)* is not used much in XAN's input data, and in LUS's data it is used mainly for one referent-inside the house. It also extends to inside a corral and inside a pot, and to the region inside water. A second spatial nominal *y-olil* 'its middle/between' is an occasional alternate for 'between' situations.

Tzeltal Child Data The data for the two Tzeltal children at time 1 and time 2 are summarized in Table 4.9. As in the case of Hindi, there are very few expressions involving containment (a total of 28 tokens in 14 hours of recording), and little diversity in the range of containment terms in the speech of the children acquiring Tzeltal at time point 1. All of these containment expressions are used in motion contexts, either spontaneous or caused. The verb used predominantly is the general verb *och* 'enter' (21/28 utterances). The other verbs used occasionally

TABLE 4.9 Frequency of Containment Terms in Child Tzeltal

	LUS		XAN	
	tl	**t2**	**tl**	**t2**
och 'enter'	8 (72.7%)	**14 (73.7%)**	13 (76.5%)	14 (58.3%)
otz-es 'make enter'	1 (9%)	**0**	0	2 (8.3%)
ch'ik 'insert [long thin thing parallel]'	0	**3 (15.8%)**	4 (23.5%)	4(16.7%)
tik' 'insert [into container with opening]'	0	**1 (5.2%)**	0	2 (8.3%)
lut 'insert between'	2 (18.2%)	**0**	0	2 (8.3%)
y-ut(il) 'its inside'	0	**1 (5.2%)**	0	0
Total no. of containment terms	11	**19**	17	24

TABLE 4.10 Selected Types of Contexts of Use: Containment Expressions Used by Two Tzeltal Children, XAN and LUS, at tl

Broad context of use	**Linguistic form for IN**	**Specific context of use**	
		LUS	**XAN**
Caused motion	*otz-es*	piece puzzle	firewood into fire
Caused motion specific	*ch'ik*		
	lut	dog taking child's lollipop away in its mouth	
Spontaneous motion	*och*	chicken into house puzzle piece into puzzle board chicken into yard	tortilla into container firewood into fire water into container into cart girl into toy cart bug into hole fly into crack fly under stool

include *otz-es* 'enter-CAUSE' (used once by LUS), as well as two semantically specific insertion verbs: *ch'ik* 'insert between' (by XAN) and *lut* 'insert tightly between' (by LUS). The spatial nominal *y-util* is not used at time 1 by either child, in either static or dynamic contexts.

The data for t2, about five months later, show that by now, the children are producing a somewhat higher number of containment expressions (n = 43 tokens in 7.5 hours of recording). The use of *och* enter' remains high (28/43 uses), and the number of uses of the caused motion verbs increases. These include the general 'insert' verb *otz-es* 'enter-CAUSE' and three specific verbs: *ch'ik* 'insert between parallel long thin things,' *lut* 'insert tightly between,' and *tik'* 'insert into container.' The spatial nominal *y-util* makes an appearance in LUS's data, but only in a single

TABLE 4.11 Selected Types of Contexts of Use: Containment Expressions Used by Two Tzeltal Children, XAN and LUS, at t2

Broad context of use	Linguistic form for IN	Specific context of use	
		LUS	**XAN**
Caused motion—general	*oiz-es*		hand into puppet corncob into pail of corn kernels
Caused motion— specific	*ch'ik*		gum into mouth bowl edge into mouth [of baby] making toy duck insert her finger into its mouth
	tik'	mud into container	toy into cup
Spontaneous motion	*och*	flower into bucket handle onto toy pail balloon into bag something into car something over there ring onto ring toy something entered over there hand into puppet	make something enter her hand into puppet cows into box toy man into car toy into container ribbon in cup into her drink
Stative	*ij-ut*	mother inside the house	

instance, in a static context. At both time points, the containment terms are used by the children in ways that are contextually appropriate (Tables 4.10 and 4.11).

Conclusions from the Tzeltal Data We have seen that the children's preferred form for talking about containment in Tzeltal is neither the unconflated general form *y-util* 'its-inside' nor the very specific verbs *ch'ik, lut, tik'*. Rather it is the general verb of spontaneous motion into containment, *och* 'enter,' which appears early and is used frequently at both tl and t2. This is followed by the specific 'insert' verbs *ch'ik, lut,* and *tik',* while the spatial nominal *y-util* emerges late.

Perhaps it is the case that Tzeltal children show a preference for specificity in a different way—perhaps they undergeneralize *och* 'enter' initially, and use it only in highly context-bound ways. However, as shown in Table 4.10, the use of *och* is already quite productive at tl, occurring with nominals denoting a variety of Ground objects (e.g., container, cart, crack, stool, hole, house, yard, puzzleboard) and Figure objects (e.g., tortilla, water, bug, fly, girl, puzzle piece, chicken). Nor do we find the opposite pattern, with children owergeneralizing the very specific verbs. Verbs such as *tik'* and *lut* are used appropriately, suggesting that children are respecting the selectional restrictions of these very specific verbs. A similar

finding is reported by Choi and Bowerman (1991) for Korean children's early uses of semantically specific verbs (e.g., put into loose- vs. tight-fitting containment).

The preference in Tzeltal for *och* over specific verbs like *tik', ch'ik,* etc., seems to confirm the conclusion drawn from the Hindi data that the strong form of the specificity hypothesis is not supported. Taken in conjunction with the Hindi data, this might suggest strong support in favour of a position that children prefer more frequent and/or semantically general forms over more specific ones. However, the Tzeltal children's earlier and more frequent use of the very specific verbs *{ch'ik, lut, tik')* relative to the more general spatial nominal *y-util* suggests that children do not always prefer general, frequent forms either. While the frequency of the specific verb *tik'* in the input appears to be high (34 times in LUS's tl data), in fact this is true for only one of the children and is due to the particular activity of playing with a puzzle board. But the frequency with which *y-util,* a general term., is used in the input is as high as or higher than the frequency of each of the specific verbs for both children. Based on input frequency alone, we might expect that the specific verbs and the spatial nominal should be used with roughly comparable frequencies by the children. However, we found that the specific forms were used more frequently than *y-util,* which was the least frequently used form for both children. The minimal use of *y-util* (and possibly, of Hindi *andar)* might be related to the fact that, like English *inside, y-util* is an optional, extra-specific manner of expressing location at the inside of a space construed as a container. This optional specificity contrasts with the obligatory specificity in the Tzeltal transitive verbs: In the latter case, if the situation is one captured by a specific verb, the specific verb will almost always be used.

Further, a number of the semantically specific verbs that share the semantic space of containment with *och* and *otzes* are also very early in the child data. One might want to argue that the specific verbs are used so infrequently in the children's data that we can dismiss them, that they are perhaps just frozen expressions. Given the nature of our data (naturally occurring production) we cannot entirely rule this out. However, each of these verbs is also infrequent in the input speech, and for a good reason: Their specificity means that they apply in a very narrow range of situations, and unless those situations arise in the sessions being filmed, the verbs will not appear. In another sense these verb *types* are not so infrequent: In the input data a total of 16 semantically specific transitive verb roots are used (as well as one intransitive: *matz'aj* 'to be stuck in mud'); they appear also in stative and nominalized forms. In both the children's speech and in the input speech, these verbs crop up whenever the relevant well-defined kind of situation occurs. The fact that these not very frequent verbs are acquired early suggests that there is in fact something salient about a verb used in only one or two different contexts, if those contexts happen to be ones important to a child.

GENERAL DISCUSSION

Our study shows that children talking about containment use relatively abstract relational forms early, irrespective of their syntactic category (case markers, verbs,

or spatial nouns or adjectives), and they produce them frequently and in varied contexts of use. The general case-marker *mE* is used more than all other forms in Hindi, while in Tzeltal, the general verb *och* 'enter' is used more than the specific verb forms, even when the latter are pooled together. A semantic specificity preference does not play a strong role in children's acquisition of containment expressions in Hindi and Tzeltal. Children do not associate semantically general expressions with concrete, narrowly specified event schemas for a protracted period of their development. Any preference for sticking to very narrow, object-specific schemata in the use of a relational word, if it exists at all, must occur quite early and be relatively short-lived. Children appear capable of creating quite general relational categories at an early age: *mE* is used appropriately and productively in Hindi child language as early as 20 to 21 months. The only restriction we observed is in a lack of extensions of *mE* to the temporal domain.

Whereas children can generalize rapidly, our crosslinguistic comparison also shows that they are not driven by a global preference to construct a semantically general category of containment. In this respect, our findings echo the observations in Choi and Bowerman (1991) showing early, language-specific categorization of motion events in children acquiring English and Korean. Hindi children appropriately use very general terms such as *mE* which abstracts away from the distinction between stative and (caused) motion events, while Tzeltal children accurately restrict use of the general verbs *och* and *otzes* to spontaneous and caused motion contexts, respectively. Children are also appropriate in their use of the Tzeltal "insert" verbs which distinguish between very specific varieties of containment. The types of overgeneralization errors that one might expect if children were motivated by a tendency to create a general category of containment are not attested in these data. (See Narasimhan, 2005 for similar arguments regarding the semantic category of "Agent.")

It might be argued that early use of semantically specific verbs in Tzeltal constitutes evidence for a semantic specificity preference. For instance, despite the paucity of specific "insertion" verbs in the data, Tzeltal children are using several distinct IN verbs *{och, otzes, hit, ch'ik)* at an early age, which is compatible with the findings for Tzeltal verbs in other semantic domains. Semantically specific verbs are an important part of the vocabulary of Tzeltal children from their first productions at age 1;6 (Brown, 1998; see also Narasimhan & Gullberg, 2006). De Leon (1999a, 1999b, 2001, this volume) reports similar findings for children learning the closely related language Tzotzil, and Tardif (2006) reports the same for Chinese. A psychological explanation for the early acquisition of semantically specific verbs in languages like Tzeltal, Tzotzil, and Chinese was proposed by Gentner and Boroditsky (2001), who relate the early use of semantically specific verbs in these languages to the fact that such verbs refer to coherent event schemata that are more highly individuated and hence relatively perceptually salient for children. Further, as pointed out in Brown (1998), Tzeltal children's early use of specific verbs might be attributed to the highly differentiated patterns of lexicalization in Tzeltal (Brown, 1994, 2001) rather than to any semantic specificity preference. Faced with a rich set of forms encoding fine distinctions in one semantic domain

after another, children acquiring Tzeltal may learn early to be conservative in generalizing the meanings of new forms.

Rapid, error-free generalization of language-specific semantic categories, as shown in our study, is something of a paradox. As many researchers have pointed out, the elements of a situation that are encoded by a relational expression are not easily inferred, suggesting that there might be a protracted period of learning characterized by restricted patterns of generalization and/or early errors. To resolve this paradox, Bowerman and Choi (2001, p. 497) suggest that "children construct spatial semantic categories over time on the basis of the way they hear words used in the input" but they also draw on "perceptual sensitivities and conceptual biases they bring with them to the task." In the process of acquiring the meanings of words, children "do not waste time on crazy possibilities and have some sense of what properties of situations are likely to matter" (Bowerman & Choi, 2001, p. 503). At the same time, characteristics of the language influence children's construction of semantic categories as well, including the *frequency* with which given words are used in the input, the *consistency* of the range of referents for which the words are used, the *number* of words used to label a particular semantic domain, and the *degree of overlap* in the referents for which different words are used (Bowerman & Choi, 2001, p. 498). Such a multifactorial account may not only explain the early and rapid acquisition of terms in the domain of containment in children learning different languages, but also children's sensitivity to the different factors that influence semantic category construction in their language (see Narasimhan & Gullberg, 2006). Further research is required to identify the relative contribution of the different factors that influence vocabulary acquisition in children learning different languages.

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